

# CBO's Economic Forecast: Understanding Productivity Growth

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Aaron Betz

Macroeconomic Analysis Division

# The Purpose of CBO's Economic Forecast

The forecast is used primarily as an input to CBO's 10-year federal budget projections and analyses of legislative proposals.

It is a **current-law** forecast:

- It incorporates the assumption that legislation will not change but that changes in policy built into current legislation will occur.
- For example, current tax law provides for the expiration of certain provisions within the next 10 years.
- CBO's current forecast projects economic responses to the expiration of those provisions.

# CBO's Approach to Forecasting

CBO's approach involves projections of:

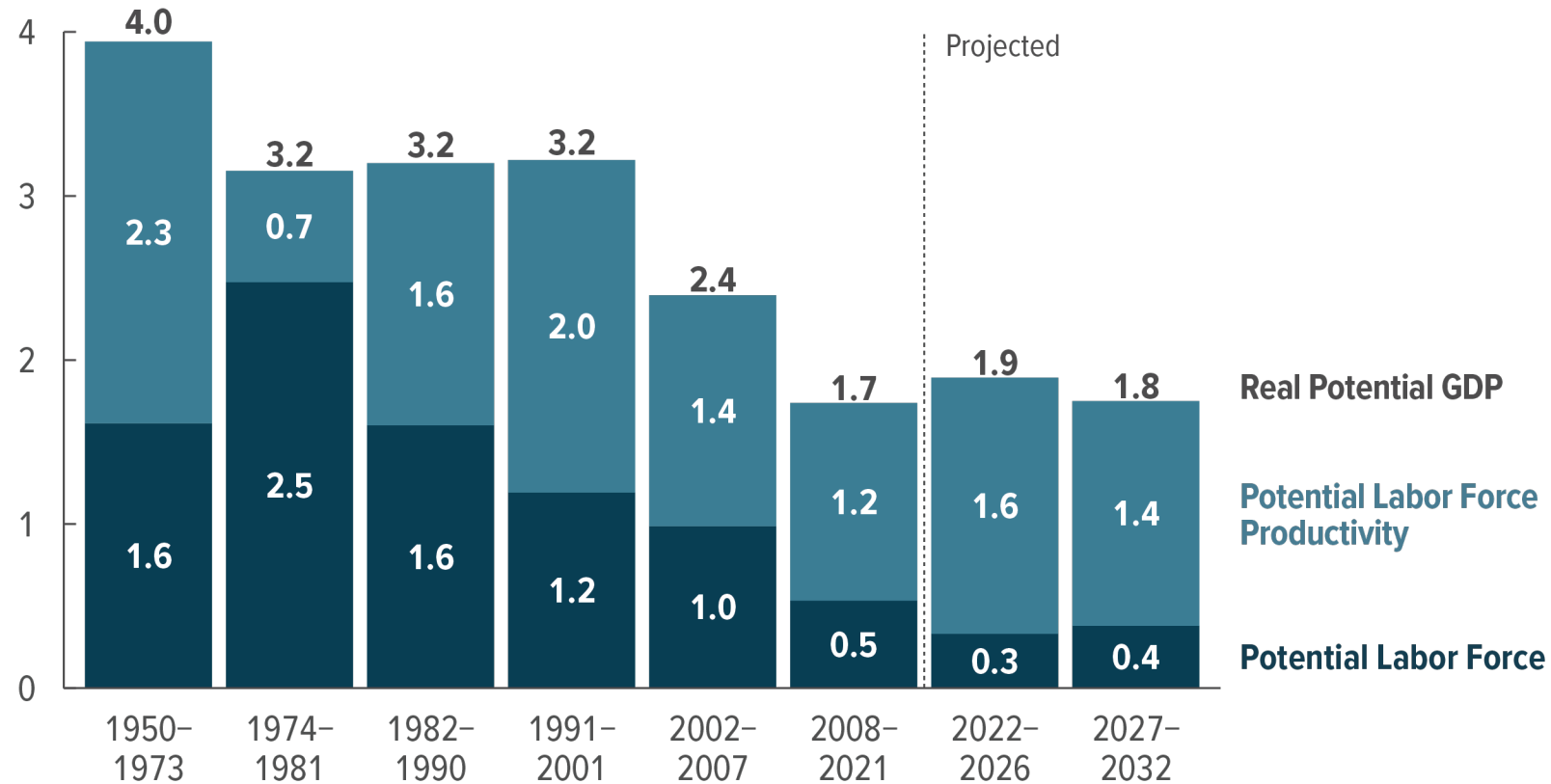
- **Potential (maximum sustainable) output** in a Solow growth model framework and
- **Actual output** in a standard macroeconometric model.

The estimate of potential output is mainly based on estimates of:

- The potential labor force,
- The flow of services from the capital stock, and
- Potential total factor productivity in the nonfarm business sector.

# Average Annual Growth of Real Potential Gross Domestic Product

Percent



Real values are nominal values that have been adjusted to remove the effects of inflation.

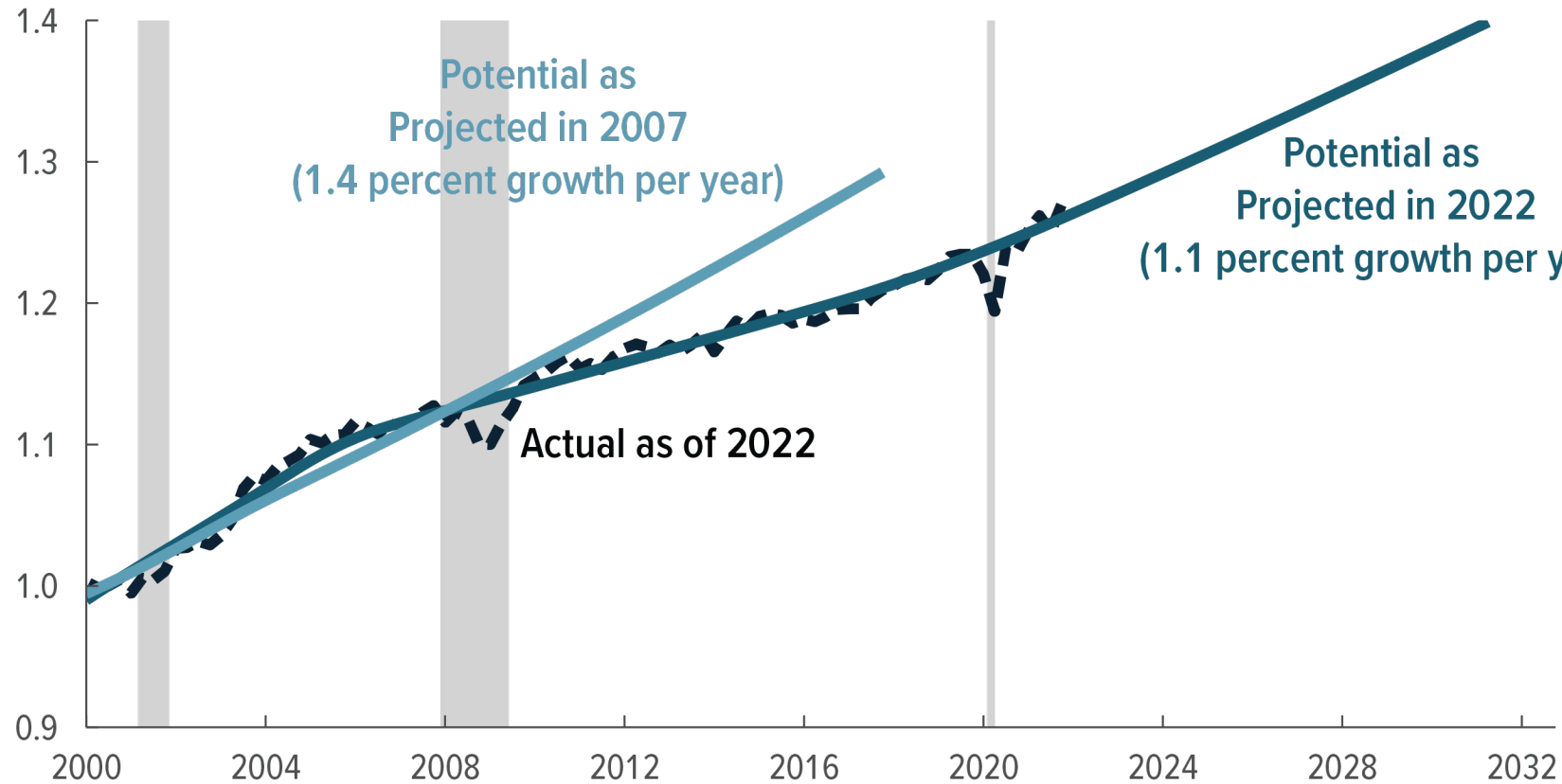
# Key Estimates in CBO's May 2022 Projections of Potential Gross Domestic Product

Average Annual Percentage Growth, by Calendar Year

	Historical Periods							Projected, 2022– 2032
	1950– 2021	1950– 1973	1974– 1981	1982– 1990	1991– 2001	2002– 2007	2008– 2021	
Overall Economy								
Potential Output	3.1	4.0	3.2	3.2	3.3	2.4	1.7	1.8
Potential Labor Force	1.4	1.6	2.5	1.6	1.2	1.0	0.5	0.4
Potential Labor Productivity	1.7	2.3	0.7	1.6	2.0	1.4	1.2	1.5
Nonfarm Business Sector								
Potential Output	3.4	4.1	3.5	3.5	3.7	2.6	2.0	2.1
Potential hours	1.3	1.4	2.3	1.7	1.2	0.3	0.6	0.4
Capital services	3.4	3.8	3.7	3.5	3.9	2.8	2.3	2.4
Potential total factor productivity	1.4	1.9	0.8	1.1	1.5	1.5	0.8	1.1
Potential Labor Productivity	2.1	2.6	1.2	1.7	2.4	2.4	1.4	1.8

# Total Factor Productivity in the Nonfarm Business Sector Since 2000

2000 = 1



Shaded vertical bars indicate periods of recession.

# The Effects of the Pandemic on Total Factor Productivity

The coronavirus pandemic had very large short-term effects on total factor productivity. But the decline in total factor productivity was relatively small when compared with the decline in employment.

- Social distancing sped the adoption of new technologies, such as teleconferencing and telemedicine.
- It is not clear whether that acceleration was a onetime occurrence that simply pushed ahead changes that would have occurred soon anyway.

The longer-term effects on total factor productivity are very unclear.

- Innovations associated with working from home could lead to substantial reductions in costs and improvements in productivity in some sectors.
- Productivity improvements could lead to a decline in measured gross domestic product (because of less commuting and less consumption associated with office work).
- Conversely, disruptions to the education system could have lasting effects on the future productivity of workers.

# Why Has the Growth of Total Factor Productivity Slowed Over the Longer Term?

The slowdown began around 2005, before the financial crisis and the resulting recession.

It is widespread among industries and international in scope.

Five areas of inquiry might shed light on the slowdown:

- Measurement issues
- Growth feedbacks
- Demographic effects
- Structural issues
- A slowdown in basic innovation



# **The Slowdown of Growth of Total Factor Productivity: Measurement Issues**

Mismeasurement of real (inflation-adjusted) inputs and outputs is persistent.

However, measurement issues can account for only a small portion of the slowdown of total factor productivity growth:

- Mismeasurement does not appear to be worse than it was in the past.
- Products no longer measured in output have relatively modest value to consumers compared with “missing” growth in total factor productivity. An example is digital photographs, which have largely replaced printed ones and do not show up in gross domestic product.
- Measurement errors related to international supply chains are thought to explain less than 0.1 percentage point of the slowdown of growth of estimated total factor productivity per year.

# **The Slowdown of Growth of Total Factor Productivity: Growth Feedbacks**

Growth of the labor supply has slowed dramatically.

Aggregate demand recovered slowly in the aftermath of the 2007–2009 recession.

Both developments have led to relatively modest demand for capital investment.

The net result is slower turnover of the capital stock and slower introduction of new technologies.

However, there is little evidence of a backlog of technology.

# **The Slowdown of Growth of Total Factor Productivity: Demographic Effects**

Highly skilled and well-educated baby boomers are retiring, lowering the aggregate level of human capital.

However, skilled and experienced workers tend to stay in the labor force longer, pushing up the average skill level.

Educational attainment has grown more slowly than in previous generations because it is already at a high level.

However, educational attainment among younger cohorts has continued to improve, especially during the 2007–2009 recession and its slow recovery.

# The Slowdown of Growth of Total Factor Productivity: Structural Issues

There is declining dynamism in the economy:

- Top firms in many industries continue to have strong productivity growth, but other firms increasingly lag behind.
- Rates of firms' entry and exit have declined.
- The share of employment and output accounted for by young firms (historically a source of productivity growth) has fallen.

But there is no consensus on the causes:

- Are barriers to entry getting higher?
- Are product markets becoming less contestable?

Some research suggests that restrictive land-use regulations increasingly raise housing costs and discourage workers from migrating to denser urban areas, where most growth in productivity occurs.

# The Slowdown of Growth of Total Factor Productivity: A Slowdown in Basic Innovation

The pessimistic view:

- Innovation from the late 19th century through the early 1970s involved the discovery of several “general purpose technologies” and was unique and unsustainable.
- Acceleration in total factor productivity during the 1990s and 2000s was a temporary deviation related to a new general purpose technology: information technology.
- We are “running out of ideas”: Research costs are rising, and new ideas are not as economically significant.

# **The Slowdown of Growth of Total Factor Productivity: A Slowdown in Basic Innovation**

The optimistic view:

- The pool of potential innovators and the potential market for products are now global.
- Research tools are greatly improved.
- Communication of innovations is much more rapid.
- Major advances in technology can be expected—the most recent being information technology.
- However, general purpose technologies diffuse slowly, so their economic impact will take time.

# The Slowdown of Growth of Total Factor Productivity: A Conceptual Error?

A middle view, perhaps:

- In a recent paper, Thomas Philippon argues that economists have mistakenly assumed that innovations yield a constant growth rate for total factor productivity.
- Instead, the data suggest that innovations yield constant increments to total factor productivity over time.
- That implies a declining growth rate for total factor productivity over time.
- However, new general purpose technologies can change the size of increments for a period of time.

## Additional Information

Congressional Budget Office, *The Budget and Economic Outlook: 2022 to 2032* (May 2022), [www.cbo.gov/publication/57950](https://www.cbo.gov/publication/57950).

Robert Shackleton, *Estimating and Projecting Potential Output Using CBO's Forecasting Growth Model*, Working Paper 2018-03 (Congressional Budget Office, February 2018), [www.cbo.gov/publication/53558](https://www.cbo.gov/publication/53558).